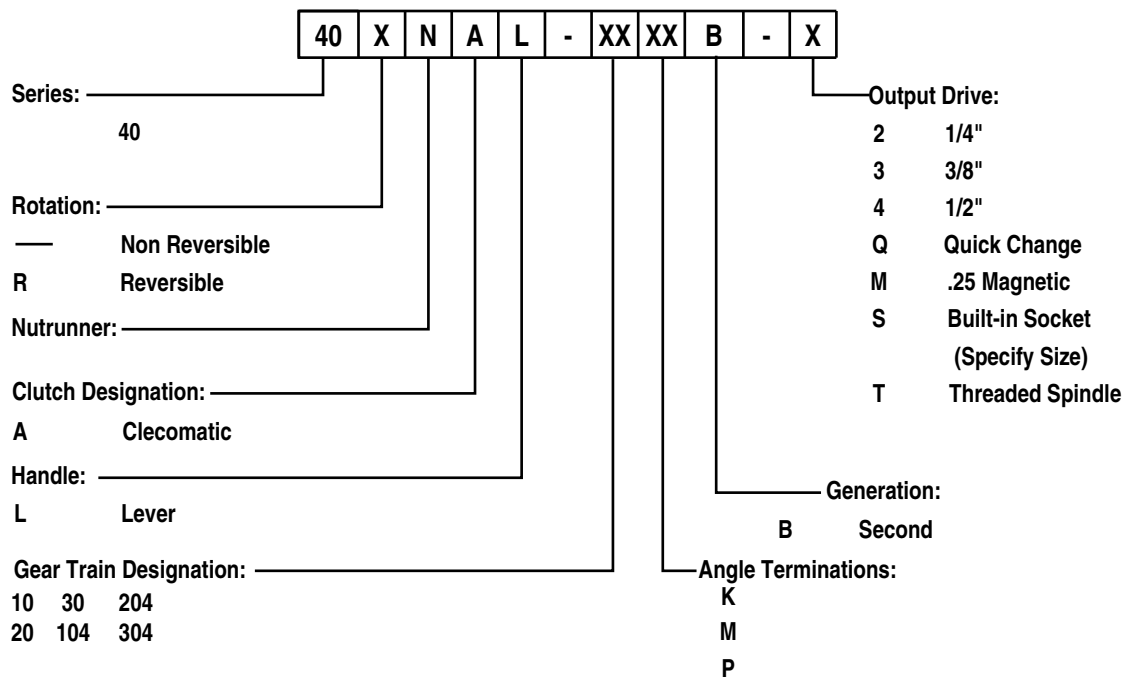


Cleco®

40 Series Nutrunners



For additional product information visit our website at <http://www.clecotools.com>

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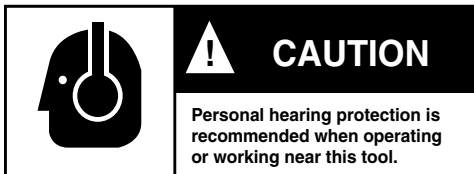
Safety Recommendations

For your safety and the safety of others, read and understand the safety recommendations and operating instructions before operating a nutrunner.

Always wear protective equipment:



For additional information on eye protection and face protection, refer to Federal OSHA Regulations, 29 Code of Federal Regulations, Section 1910.133, Eye and Face Protection, and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.



Hearing protection is recommended in high noise areas 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises and resonant structures can substantially contribute to, and increase the noise level in the area. Excessive air pressure above 90 PSIG and worn motor components can also increase sound level emitted by tool. Proper hearing conservation measures, including annual audiograms and training in the use and fit of hearing protection devices may be necessary. For additional information on hearing protection, refer to Federal Regulations, Section 1910.95, Occupational Noise Exposure, and American National Standards Institute, ANSI S12.6, Hearing Protectors.

Cleco nutrunners are designed to operate on 90 psig (6.2 bar) maximum air pressure. If the tool is properly sized and applied, higher air pressure is unnecessary. Excessive air pressure increases the loads and stresses on the tool parts, sockets, and fasteners and may result in breakage. Installation of a filter-regulator-lubricator in the air supply line ahead of the tool is recommended. Before the tool is connected to the air supply, check the throttle for proper operation (i. e., throttle moves freely and returns to closed position). Being careful not to endanger adjacent personnel, clear

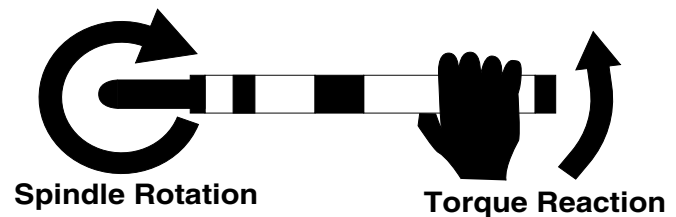
the air hose of accumulated dust and moisture. Before connecting a tool to the air hose or removing a tool from service or changing sockets, make sure the air line is shut off and drained of air. This will prevent the tool from operating if the throttle is accidentally engaged.

⚠ CAUTION

When using right angle nutrunners, be sure the throttle is positioned relative to the angle head so that the throttle will not become wedged against an adjacent object in the "ON" position due to torque reaction. The angle head may be repositioned with respect to the lever to accommodate proper location for task. If tool is to be reversed, locate throttle lever in a neutral position that will prevent entrapment. Refer to operating instructions for additional information.

It is essential for safe operation that any operator of a nutrunner use good balance, sure footing, and proper posture in anticipation of a torque reaction.

Tools with clutches can stall rather than shut-off if adjusted over maximum power output of tool, or if there is a drop in air pressure. Operator must then resist stall torque until throttle is released.



Tool balance arms are available to absorb the torque reaction of the tool while balancing the weight of the tool for improved ergonomic applications.

Safety Recommendations



WARNING

Repetitive work motions and/or vibration may cause injury to hands and arms.

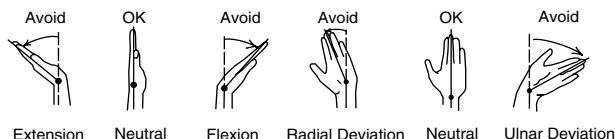
Use minimum hand grip force consistent with proper control and safe operation.
Keep body and hands warm and dry.
Avoid anything that inhibits blood circulation.
Avoid continuous vibration exposure.
Keep wrists straight.
Avoid repeated bending of wrists and hands.

Some individuals may be susceptible to disorders of the hands and arms when performing tasks consisting of highly repetitive motions and/or exposure to extended vibration. Cumulative trauma disorders such as carpal tunnel syndrome and tendonitis may be caused or aggravated by repetitious, forceful exertions of the hands and arms. Vibration may contribute to a condition called Raynaud's Syndrome. These disorders develop gradually over periods of weeks, months, and years. It is presently unknown to what extent exposure to vibrations or repetitive motions may contribute to the disorders. Hereditary factors, vasculatory or circulatory problems, exposure to cold and dampness, diet, smoking and work practices are thought to contribute to the conditions.

Any tool operator should be aware of the following warning signs and symptoms so that a problem can be addressed before it becomes a debilitating injury. Any user suffering prolonged symptoms of tingling, numbness, blanching of fingers, clumsiness or weakened grip, nocturnal pain in the hand, or any other disorder of the shoulders, arms, wrists, or fingers is advised to consult a physician. If it is determined that the symptoms are job related or aggravated by movements and postures dictated by the job design, it may be necessary for the employer to take steps to prevent further occurrences. These steps might include, but are not limited to, repositioning the workpiece or redesigning the workstation, reassigning workers to other jobs, rotating jobs, changing work pace, and/or changing the type of tool used so as to minimize stress on the operator. Some tasks may require more than one type of tool to obtain the optimum operator/tool/task relationship.

The following suggestions will help reduce or moderate the effects of repetitive work motions and/or extended vibration exposure:

- Use a minimum hand grip force consistent with proper control and safe operation
- Keep body and hands warm and dry (cold weather is reported to be a major factor contributing to Raynaud's Syndrome)
- Avoid anything that inhibits blood circulation
 - Smoking Tobacco (another contributing factor)
 - Cold Temperatures
 - Certain Drugs



- Tasks should be performed in such a manner that the wrists are maintained in a neutral position, which is not flexed, hyperextended, or turned side to side.
- Stressful postures should be avoided — select a tool appropriate for the job and work location
- Avoid highly repetitive movements of hands and wrists, and continuous vibration exposure (after each period of operation, exercise to increase blood circulation)
- Keep tool well maintained and replace worn parts

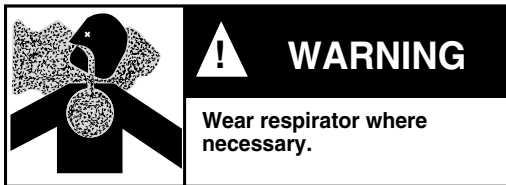
Work gloves with vibration reducing liners and wrist supports are available from some manufacturers of industrial work gloves. Tool wraps and grips are also available from a number of different manufacturers. These gloves, wraps, and wrist supports are designed to reduce and moderate the effects of extended vibration exposure and repetitive wrist trauma. Since they vary widely in design, material, thickness, vibration reduction, and wrist support qualities, it is recommended that the glove, tool wrap, or wrist support manufacturer be consulted for items designed for your specific application. **WARNING! Proper fit of gloves is important. Improperly fitted gloves may restrict blood flow to the fingers and can substantially reduce grip strength.**

Safety Recommendations

ADDITIONAL SAFETY RECOMMENDATIONS FOR USE OF RIGHT ANGLE DRILLS



Follow good machine shop practices. Rotating shafts and moving components can entangle and entrap, and can result in serious injuries. Never wear long hair, loose-fitting clothes, gloves, ties, or jewelry when working with or near a drill of any type.



Drilling or other use of this tool may produce hazardous fumes and/or dust. To avoid adverse health effects, utilize adequate ventilation and/or a respirator. Read the material safety data sheet of any cutting fluids or materials involved in the drilling process.

! CAUTION

- Drill bits are sharp. Handle them carefully to avoid injury.
- The cutting tool maximum speed rating must equal or exceed the rated speed of the tool.
- Use the appropriate size chuck key to securely tighten a drill bit in the chuck.
- Use precautions when drilling because of the possibility of the cutting tool bending or breaking.
- High reaction torque may be experienced by the operator with any drill at breakthrough.
- Drill bits or accessories not centered properly in the chuck can cause excessive wobble or vibration.

For more information on the safe use of portable air tools, see the latest edition of ANSI B186.1, Safety Code for Portable Air Tools, available from the American National Standards Institute, Inc. 11 West 42nd Street, New York, NY 10036.

This information is a compilation of general safety practices obtained from various sources available at the date of production. However, our company does not represent that every acceptable safety practice is offered herein, or that abnormal or unusual circumstances may not warrant or require additional procedures. Your work may require additional specific safety procedures. Follow these procedures as required by your company.

Warning Labels

The warning labels found on these tools are an essential part of this product. Labels should not be removed. Labels should be checked periodically for legibility. Replace warning labels when missing or when the information can no longer be read. Replacement labels can be ordered as any spare part.



203185



203289

OPERATING AND SERVICE INSTRUCTIONS

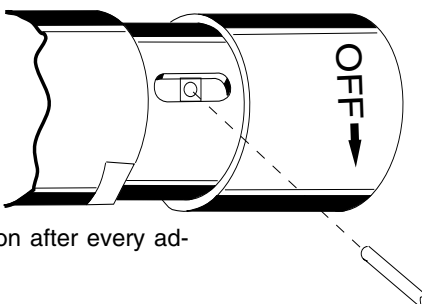
FOR YOUR SAFETY AND THE SAFETY OF OTHERS READ AND UNDERSTAND THE SAFETY RECOMMENDATIONS ON PAGES 2 thru 4 BEFORE OPERATING A NUTRUNNER.

CLECOMATIC MODELS

Tools equipped with the CLECOMATIC clutch are designed to tighten the fastener to a predetermined torque and shut off automatically. Releasing the throttle lever will allow the tool to reset for the next cycle.

CLUTCH ADJUSTMENT

Shut off air supply to the tool and rotate the adjustment cover, No. 202829, 180° to uncover the adjustment slot in the clutch housing. Rotate the spindle until the hole in the adjustment nut is visible in the slot. Use a 1/8" (3mm) diameter pin to hold the nut. Use a suitable tool to turn the spindle in a counterclockwise direction to increase torque or clockwise to decrease torque. Return the adjustment cover to its closed position after every adjustment.



CAUTION

If the clutch is adjusted over the maximum power output of the tool, the clutch will not function and the tool will operate like a stall-type tool. Also, if the tool is being operated at its upper torque limits, a drop in air pressure could cause the clutch not to function due to a loss of motor power and the tool will function like a stall-type tool. If tool stalls, operator must resist stall torque until the throttle is released.

Operational check: Grip tool securely and be prepared to counteract stall torque in case clutch is improperly adjusted. THIS IS A HIGH TORQUE TOOL.

THROTTLE POSITION

"K" & "M" Right Angle Head

Both the "K" & "M" heads are threaded to the gear case. Throttle positioning is accomplished by using shims between the head and the gear case as required to properly position the throttle lever with respect to the head to prevent hand entrapment. (See Torque Reaction page2). Retighten head with proper wrench to a torque higher than the torque rating of the tool.

"P" Right Angle Head

The throttle lever may be repositioned to accommodate proper location for task and to avoid hand entrapment. The "P" head is splined to the gear case. Repositioning of the angle head is done by loosening housing lock nut No. 203438 (left hand threads), and lifting angle head enough to disengage the spline and turning to position desired. Retighten housing lock nut with proper wrench to 20 ft. lbs.

AIR SUPPLY

For maximum performance, use a 3/8" I.D. air hose no longer than 8' in length. If additional length is required, the next larger hose should be connected to the 3/8" hose.

Being careful to avoid endangering adjacent personnel or yourself, the air hose should be cleared of accumulated dirt and moisture, then one (1) teaspoonful of 10W machine oil should be poured into the tool's air inlet before connecting the hose to the tool.

LUBRICATION

An automatic in-line filter- regulator- lubricator is recommended as it increases tool life and keeps the tool in sustained operation. The in-line lubricator should be regularly checked and filled with a good grade of 10W machine oil. Proper adjustment of the in-line lubricator is performed by placing a sheet of paper next to the exhaust ports and holding the throttle open approximately 30 seconds. The lubricator is properly set when a light stain of oil collects on the paper. Excessive amounts of oil should be avoided.

Application of the tool should govern how frequently it is greased. It is recommended that the idler gears and right angle gears receive a generous amount of NLGI 2-EP grease through the grease fittings every 40 hours of operation.

STORAGE

In the event that it becomes necessary to store the tool for an extended period of time (overnight, weekend, etc.), it should receive a generous amount of lubrication at that time and again when returned to service. The tool should be stored in a clean and dry environment.

DISASSEMBLY

GENERAL

40RNAL0M, 20M, 20K & 30K

Unscrew (left hand threads) and remove the angle head. Unscrew (left hand threads) and remove the clutch housing and clutch. Unscrew and remove the gear case assembly. The trip rod should be removed at this time to prevent its being lost or misplaced. The motor unit may now be removed from the motor housing. See the following paragraphs for complete disassembly instructions on the various sub-assemblies.

40RNAL04P, 204P & 304P

With tool mounted vertically in vise, unscrew housing lock nut No. 203438, lift up and remove the angle head. Unscrew and remove the second reduction gear train. Unscrew (left hand threads) and remove the clutch housing and clutch. Note: Do not lose finger spring spacer No. 203457. Unscrew and remove the gear case assembly. The trip rod should be removed at this time to prevent its being lost or misplaced. The motor unit may now be removed from the motor housing. See the following paragraphs for complete disassembly instructions on the various sub-assemblies.

RIGHT ANGLE HEAD DISASSEMBLY

"K" Right Angle Head

To disassemble the right angle head, unscrew the spindle bearing cap. This will permit the removal of the spindle assembly.

The pinion bearing retainer No. 863564, may be removed by utilizing a 5/8" hex nut and a 5/8" deep socket. Drop the hex nut over the pinion shaft and engage the hex in the bearing retainer and unscrew the retainer using the deep socket. Using a suitable driver, drive the pinion No. 202200, and related bearings out of the angle head.

"M" Right Angle Head

Using a suitable spanner wrench, unscrew (left hand threads) the bearing cap No. 864396. Remove the spindle, ball bearing No. 842517, and driven gear by clamping the spindle in a vise and driving the right angle housing No. 869048, away from the spindle using a soft-faced mallet. The ball bearing can now be removed by pressing the larger end of the spindle through the bearing I.D. Press the smaller end of the spindle through the gear to remove the driven gear. The pinion bearing retainer No. 863564, may be removed by utilizing a 5/8" hex nut and a 5/8" deep socket. Engage the hex in the bearing retainer and unscrew the retainer using the 5/8" deep socket. The pinion and bearings may now be removed by lightly tapping angle head on a soft surface.

"P" Right Angle Head

Using a suitable wrench, unscrew (left hand threads) the bearing cap, No. 203250. Remove the square drive spindle No. 203249 or No. 203439, ball bearing, No. 842517, and driven gear No. 203251, by clamping the square drive in the vise. Drive the right angle housing, No. 203441, away from the square drive using a soft-faced mallet. Remove the spindle retainer nut, No. 203248, with a 1/2" (12.7mm) wrench. The ball bearing can now be

removed by pressing the threaded end of the spindle through the gear to remove the driven gear. Remove the housing set screw No. 867546, and using a punch, drive the pinion gear No. 203440, and bearings No. 203253 and 202197 out the angle head.

CLUTCH DISASSEMBLY

104P, 204P & 304P Models

Unscrew the adjustment nut No. 202755. This will allow the adjustment plate No. 202754, thrust bearing No. 847596, thrust race No. 202753, torque spring, release spring No. 202752, release sleeve No. 203271, three(3) steel balls No. 842161, ball retainer No. 203272, and five (5) steel balls No. 844077, to be removed from the clutch spindle assembly.

Wash the spindle assembly in a solvent and rotate the cam No. 203270, to remove as much grease as possible. Remove the retainer ring No. 202749, ball plug No. 202748, and twelve (12) steel balls No. 842161, from the cam. This will allow the trip plunger No. 202745, reset spring No. 202763, and pin No. 843231, to be removed from the rear of the clutch spindle No. 203456.

10M, 20M, 20K & 30K Models

Unscrew the adjustment nut No. 202824. This will allow the adjustment plate No. 202754, thrust bearing No. 847596, thrust race No. 202753, torque spring, release spring No. 202752, release sleeve No. 203271, three (3) steel balls No. 842161, ball retainer No. 203272, and five (5) steel balls No. 844077, to be removed from the clutch spindle assembly.

Wash the spindle assembly in a solvent and rotate the cam No. 203270, to remove as much grease as possible. Remove the retainer ring No. 202749, ball plug No. 202748, and twelve (12) steel balls No. 842161, from the cam. This will allow the trip plunger No. 202745, reset spring No. 202763, and pin No. 843231, to be removed from the rear of the clutch spindle No. 202848.

2ND REDUCTION GEAR TRAIN DISASSEMBLY

104P, 204P & 304P Gear Trains

Remove the spider No. 203747, out the rear of gear case No. 203451. If replacement of idler gears are necessary, the idler gear pins No. 203750 can be driven out the rear of the spider with a punch. Idler gear bearings No. 203749, can be pressed out of the idler gears No. 203748.

1ST REDUCTION GEAR TRAIN DISASSEMBLY

Single Reduction — 204P, 304P, 20M & 20K Gear Trains

The spider No. 867872 or No. 869182 should be pressed out the bearing toward the rear of the gear case No. 867871. Remove the retainer ring No. 844364, and press the bearing No. 847147, out the front of the gear case.

DISASSEMBLY — Continued

If replacement of the idler gear pins is necessary, they should be pressed out the rear of the spider. See Fig. 1 for replacement pin height.

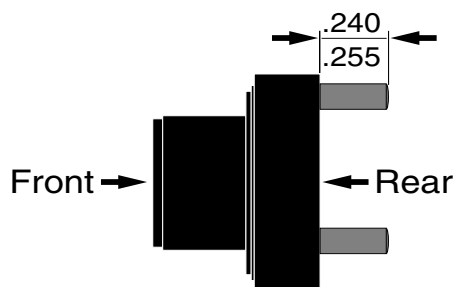
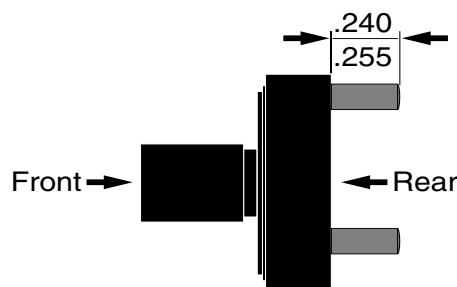


Fig. 1 — Single Reduction Spider

Double Reduction — 104P & 10M Gear Trains

Both spiders should be removed from the rear of gear case No. 867907. Remove the retainer ring No. 844364, and press the bearing No. 847147, out the front of the gear case.

If replacement of the idler gear pins is necessary, they should be pressed out the rear of the spider. See Fig. 2 for replacement pin height.



104P & 10M 1st Reduction Spider
Fig. 2 — Double Reduction Spiders

MOTOR HOUSING DISASSEMBLY

Clamp backhead No. 203473 in vise and unscrew motor housing No. 203459. Reversing valve ring No. 203466 and pin No. 867922 may be removed at this time. Tapping motor housing on soft surface should remove reversing valve No. 203465. The shut-off valve No. 203471 and shut-off valve spring No. 203472 can be removed from backhead at this time to prevent loss. The throttle rod guide can be pressed out and replaced if necessary.

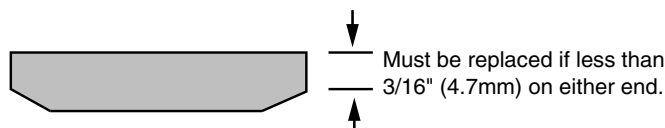
BACKHEAD DISASSEMBLY

Unscrew and remove the inlet bushing No. 203478 for inspection and cleaning of the strainer No. 203480, exhaust deflector No. 203479 and mufflers 203481. Replace any parts if clogged or torn. The porous bronze deflector can be washed in solvent and reverse blown with compressed air to clean it. The throttle valve No. 203475 and throttle valve spring No. 203476 may be removed. The throttle valve seat No. 203474 can be pressed out and replaced if necessary.

REASSEMBLY

GENERAL

All parts should be washed in a solvent and inspected for damage or wear. Particular attention should be given to all bearings, gears, gear pins, and rotor blades as failure of these parts could cause damage to more expensive parts. Rotor blades should be replaced at every repair cycle or if they measure less than 3/16" (4.7mm) on either end.



NOTE: Refer to pages 18 and 19 for proper tightening techniques for all components.

Inspect and replace any "O"-rings or seals that show signs of wear or deterioration. All gears, gear pins, and open bearings should receive a generous amount of NLGI 2-EP grease during reassembly. During reassembly of the clutch, all parts should receive a thin coating of a mixture of 10W machine oil and NLGI 2-EP grease. Reassembly of all of the various sub-assemblies is in the reverse order of disassembly; however, the following paragraphs list some of the more important reassembly procedures.

RIGHT ANGLE HEAD REASSEMBLY

"K" Right Angle Head

Slip pinion needle bearing, No. 869864, (unstamped end first) on the pinion, No. 202200, and press (press on the bearing's stamped end) the bearing to a depth of 7/8" (22mm) from the face of the bearing bore. Install pinion ball bearing, No. 847846 and bearing retainer, No. 863564, in the head and tighten retainer securely using the 5/8" (16mm) hex nut and 5/8" (16mm) deep socket. Using a suitable driver through the hole in the top of the head, drive the pinion back to make sure it is seated properly in the head.

"M" Right Angle Head

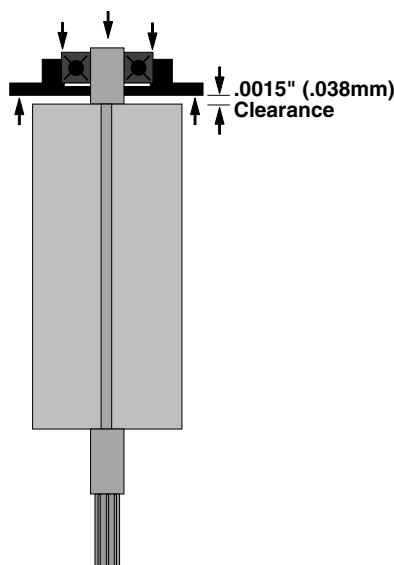
Assemble the spindle and related components in the head and securely tighten (left hand threads) the bearing cap No. 864396. Use bearing spacer No. 869050, to press the pinion needle bearing No. 863360, (press on the bearing's stamped end) in the head. Install ball bearing No. 847846, and bearing retainer No. 863564, in the head and tighten retainer securely using the 5/8" hex nut and 5/8" deep socket. Retighten head to tool with proper wrench to a torque higher than the torque rating of the tool.

"P" Right Angle Head

Assemble the spindle and related components in the head and securely tighten (left hand threads) the bearing cap No. 203250. Press the pinion needle bearing No. 203253, (press on the bearing's stamped end) into the head along with pinion No. 203440 to a depth of 1.250" (31.75mm). Install ball bearing No. 202197. Retighten housing lock nut with proper wrench to 20 ft. lbs.

MOTOR REASSEMBLY

Assemble the rear rotor bearing and rear bearing plate (press on the bearing's inner race) onto the rear rotor shaft until there is approximately .0015" (.038mm) clearance between the plate and rotor.



Assemble the rear rotor bearing and rear bearing plate (press on the bearing's inner race) onto the rear rotor shaft until there is approximately .0015" clearance between the plate and rotor. Assemble the five (5) rotor blades, cylinder, front bearing plate, and front rotor bearing (press on the bearing's inner race) to the rotor assembly. After final assembly, the cylinder should be held firmly, but not tightly between the two (2) bearing plates and the rotor should turn freely and not rub either bearing plate.

BACKHEAD REASSEMBLY

During reassembly, all "O"-rings should be lubricated with a good "O"-ring lubricant.

CLUTCH SPACING — 10, 20 & 30

Assemble the tool completely less clutch assembly and trip rod. Position the right angle head in relation to the throttle lever. Use spacers No. 863698, to position head. Break assembly apart at the clutch housing and gear case (left hand threads) and install the spacers No. 869434, five (5) spacers No. 869423, and clutch assembly. Reassemble the tool. Measure gap between the clutch housing and gear case. Remove the appropriate number of spacers No. 869423, to allow clutch housing and gear case to make up tight. NOTE: Spacers are .030" (.76mm) thick. If there is not a gap, add spacers No. 869423, to achieve one. The total amount of spacers removed must be equal to or greater than the gap.

EXAMPLE: Gap is .048" (1.22mm). Remove two (2) .030 (.76mm) thick spacers — .060 (1.52mm) total.

CLUTCH SPACING — 104, 204 & 304

The "O"-rings No. 844306 (.070" /1.8mm) and No. 813449 (.103" /2.6mm) are used to restrict the movement of the clutch in the clutch housing. The "O"-ring should be chosen that restricts the movement, but does not become compressed to tightly.

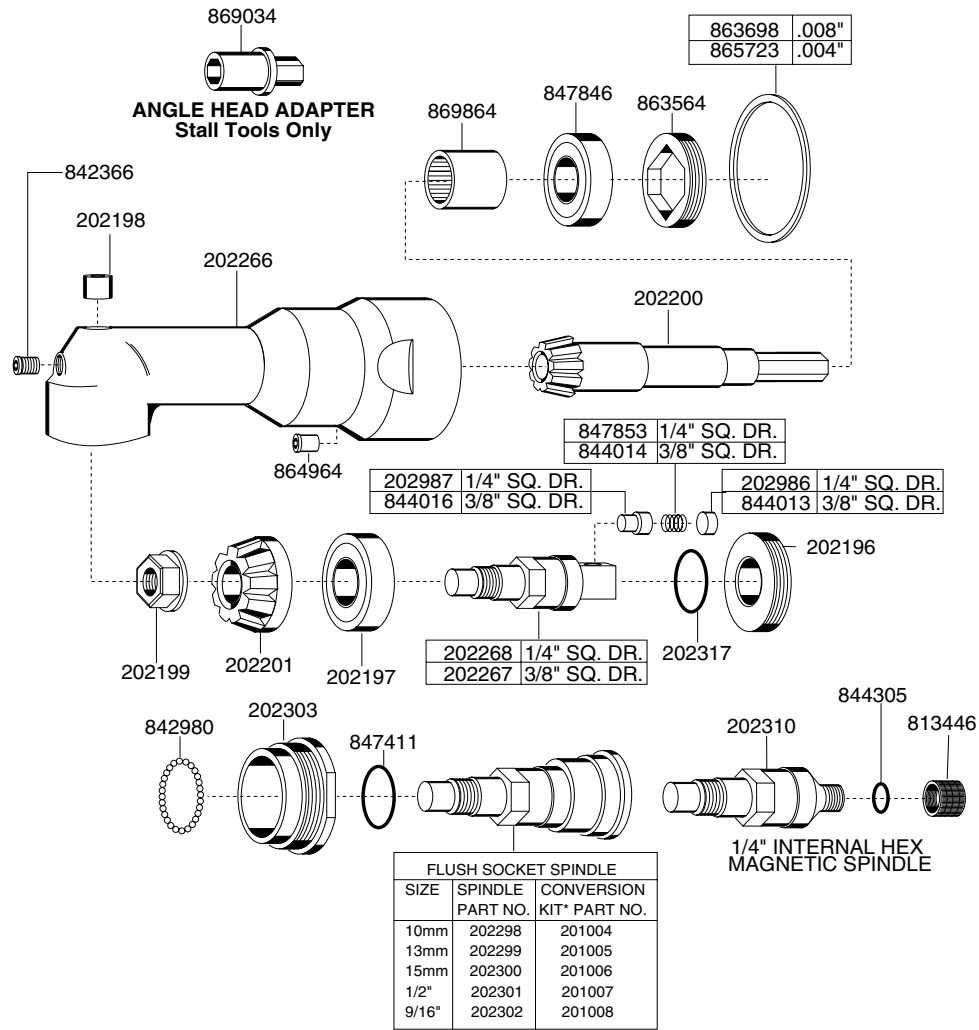
TRIP ROD SIZING

Install trip rod. Screw clutch housing down until tool begins to start. Continue to screw the housing down 3/4 to turns. Measure the gap between the clutch housing and gear case. Cut this amount off the trip rod.

SAFETY CHECK

After repair or replacement of parts, all tools should be tested to verify that the Clecomatic automatic shut-off device is functioning properly.

"K" RIGHT ANGLE HEAD



*Conversion kit contains all parts
needed to convert a "K" right angle
head to flush socket operation.

PARTS LIST — "K" RIGHT ANGLE HEAD

PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
201004	10mm Conversion Kit	1	202310	1/4" Hex Magnetic Spindle	1
201005	13mm Conversion Kit	1	202317	Felt Ring	1
201006	15mm Conversion Kit	1	202986	Lock Pin Retiner Plug (1/4")	1
201007	1/2" Conversion Kit	1	202987	Socket Lock Pin (1/4")	1
201008	9/16" Conversion Kit	1	813446	Collar(incl. 844305)	1
202196	Spindle Bearing Cap	1	842366	Plug	1
202197	Spindle Ball Bearing	1	842980	3/32" Steel Ball	23
202198	Spindle Needle Bearing	1	844013	Lock Pin Retainer Plug (3/8")	1
202199	Spindle Lock Nut	1	844014	Lock Pin Spring (3/8")	1
202200	Pinion (8T)	1	844016	Socket Lock Pin (3/8")	1
202201	Driven Gear (12T)	1	844305	1/4" x 3/8" "O"-Ring	1
202266	Angle Head (incl. 864964)	1	847411	11/16" x 13/16" "O" Ring	1
202267	3/8" Sq. Dr. Spindle (incl. 844013, 844016, 844014)	1	847846	Pinion Ball Bearing	1
202268	1/4" Sq. Dr. Spindle (incl. 202987, 847853, 202986)	1	847853	Lock Pin Spring (1/4")	1
202298	10mm Flush Socket Spindle	1	863564	Pinion Ball Ring Retainer	1
202299	13mm Flush Socket Spindle	1	863698**	.008" Spacer	*
202300	15mm Flush Socket Spindle	1	864964	Grease Plug	1
202301	1/2" Flush Socket Spindle	1	865723**	.004" Spacer	*
202302	9/16" Flush Socket Spindle	1	869034**	Angle Head Adapter	1
202303	Bearing Cap	1	869864	Pinion Needle Bearing	1

*Number of spacers required is variable.

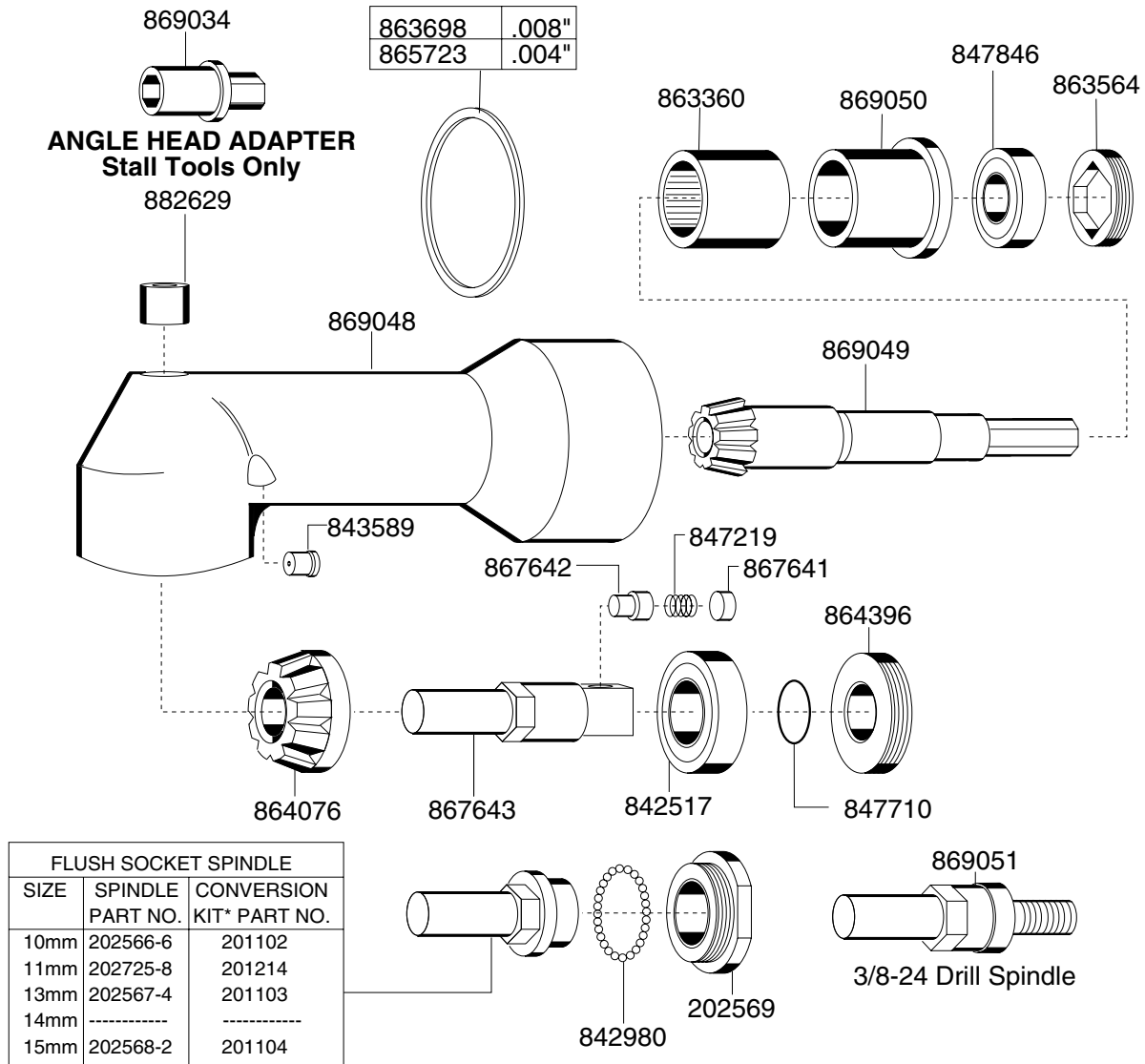
**Denotes parts not included in subassemblies listed below.

The complete "K" Right Angle Head can be purchased as a subassembly.

1/4" Square Drive — 861146

3/8" Square Drive — 861147

"M" RIGHT ANGLE HEAD



*Conversion kit contains all parts needed to convert a "M" right angle head to flush socket operation.

PARTS LIST — "M" RIGHT ANGLE HEAD

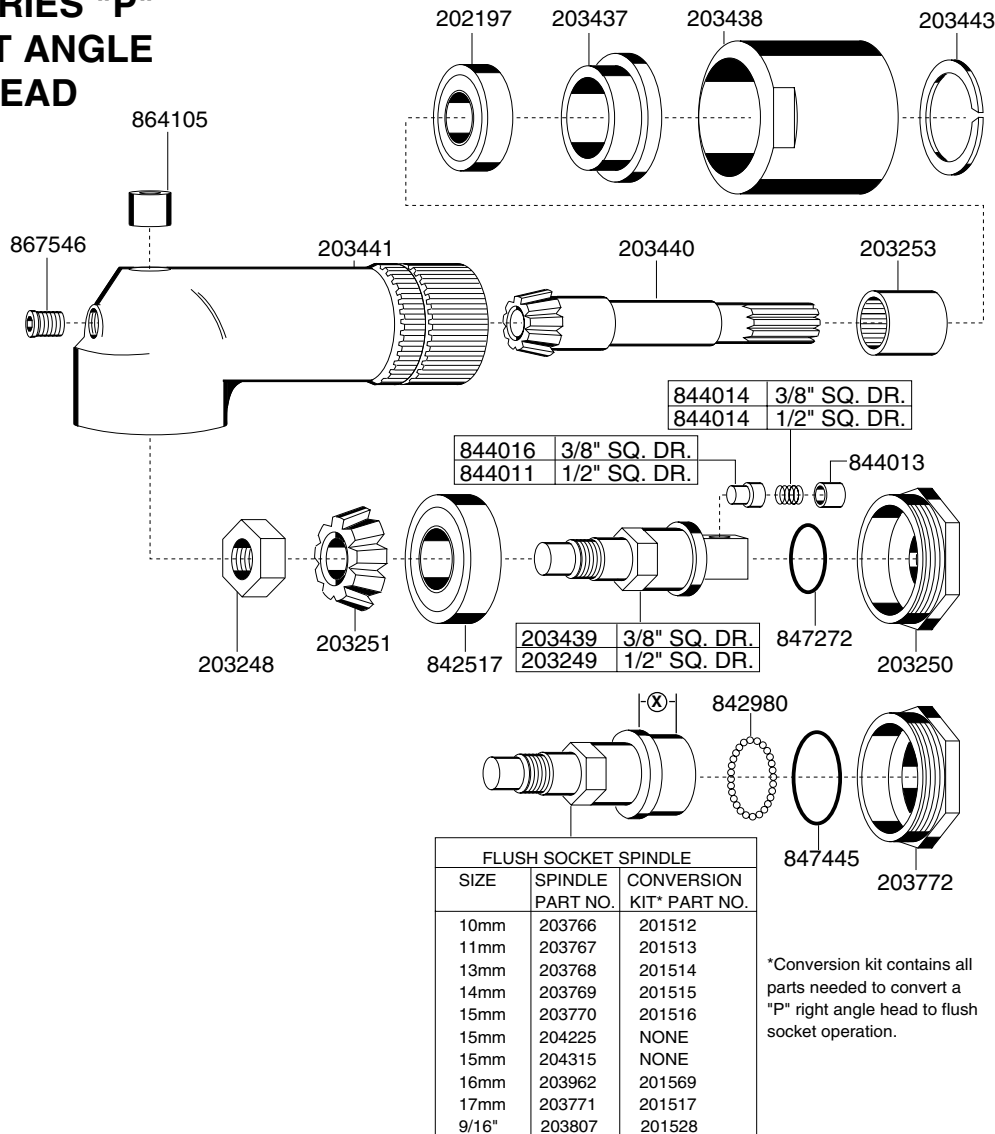
PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
201102	10mm Conversion Kit	1	863360	Pinion Needle Bearing	1
201103	13mm Conversion Kit	1	863564	Pinion Bearing Retainer	1
201104	15mm Conversion Kit	1	863698	Head Positioning Shim (.008")	*
201214	11mm Conversion Kit	1	864076	Driven Gear	1
202566	10mm Flush Socket Spindle	1	864396	Spindle Bearing Cap	1
202567	13mm Flush Socket Spindle	1	865723	Head Positioning Shim (.004")	*
202568	15mm Flush Socket Spindle	1	867641	Lock Pin Retainer Plug	1
202569	Bearing Cap	1	867642	Socket Lock Pin	1
202725	11mm Flush Socket Spindle	1	867643	3/8" Sq. Dr. Spindle (incl. 847219, 867641, 867642)	1
842517	Spindle Ball Bearing	1	869034	Angle Head Adapter	1
842980	3/32" Steel Ball	30	869048	Right Angle Head (incl. 843589)	1
843589	Grease Fitting	1	869049	Pinion	1
847219	Lock Pin Spring	1	869050	Bearing Spacer	1
847710	"O"-Ring 1/2" x 5/8"	1	882629	Spindle Needle Bearing	1
847846	Pinion Ball Bearing	1			

*Number of spacers required is variable.

**Denotes parts not included in subassemblies listed below.

The complete "M" Right Angle Head can be purchased as a subassembly.
3/8" Square Drive Spindle — 861637

40 SERIES "P" RIGHT ANGLE HEAD

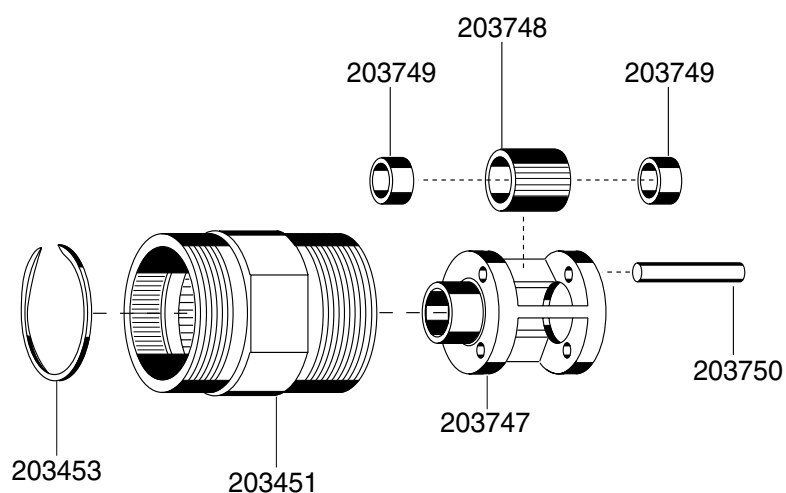


PARTS LIST — 40 SERIES "P" RIGHT ANGLE HEAD

PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
201512	10mm Conversion Kit	1	203251	Driven Gear	1
201513	11mm Conversion Kit	1	203253	Pinion Needle Bearing	1
201514	13mm Conversion Kit	1	203437	Pinion Bearing Retainer	1
201515	14mm Conversion Kit	1	203438	Housing Lock Nut	1
201516	15mm Conversion Kit	1	203439	3/8" Sq. Dr. Spindle (844016, 844014, 844013)	1
201517	17mm Conversion Kit	1	203440	Pinion Gear	1
201528	9/16" Conversion Kit	1	203441	Housing	1
201569	16mm Conversion Kit	1	203443	Housing Clamp Ring	1
203766	10mm Flush Socket Spindle	1	204225	15mm Extended Socket Spindle	1
203766	10mm Flush Socket Spindle	1	⊗ length 19/32(15mm)		1
203767	11mm Flush Socket Spindle	1	204315	15mm Extended Socket Spindle	1
203768	13mm Flush Socket Spindle	1	⊗ length 29/32(23mm)		1
203769	14mm Flush Socket Spindle	1	842517	Spindle Ball Bearing	1
203770	15mm Flush Socket Spindle	1	842980	Ball	32
203771	17mm Flush Socket Spindle	1	844011	1/2" Sq. Dr. Socket Lock Pin	1
203772	Spindle Bearing Cap	1	844013	Spring Retainer	1
203807	9/16" Flush Socket Spindle	1	844014	1/2" & 3/8" Sq. Dr. Spring	1
203962	16mm Flush Socket Spindle	1	844016	3/8" Sq. Dr. Socket Lock Pin	1
202197	Pinion Ball Bearing	1	847272	"O"-Ring 5/8" x 3/4"	1
203248	Spindle Lock Nut	1	847445	"O"-Ring 1/16" X 15/16"	1
203249	1/2" Sq. Dr. Spindle (incl. 844011, 844014, 844013)	1	864105	Housing Needle Bearing	1
203250	Spindle Bearing Cap	1	867546	Housing Set Screw	1

The complete right angle head can be purchased as a subassembly using these part numbers:
3/8" sq. dr. — 201417 — 1/2" sq. dr. — 201418

**40 SERIES
2ND REDUCTION GEAR TRAIN
FOR
104P, 204P & 304P**

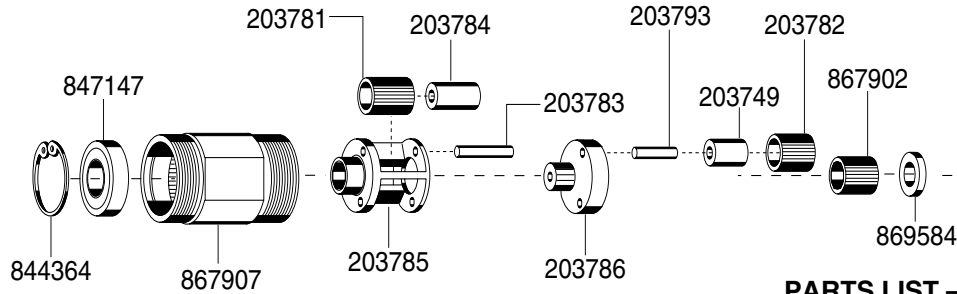


**PARTS LIST
40 SERIES 2ND REDUCTION
GEAR TRAIN FOR 104P, 204P & 304P**

PART NO.	NAME OF PART	QTY.
203451	Gear Case (45T)	1
203453	Retainer Ring	1
203747	Spider	1
203748	Idler Gear (incl. 2 - 203749)	3
203749	Idler Gear Bearing	6
203750	Idler Gear Pin	3

The complete 2nd reduction gear train can be purchased as a subassembly using part number 201521.

1ST REDUCTION 104P & 10M GEAR TRAIN



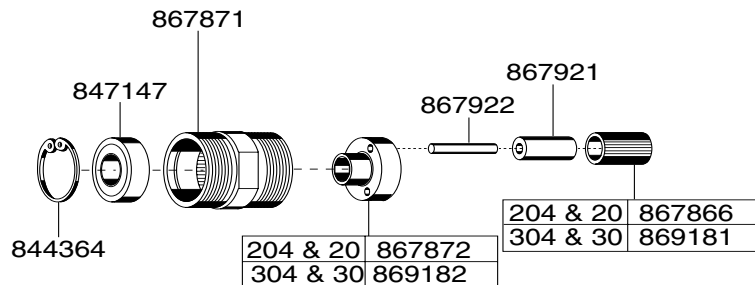
PARTS LIST — 104P & 10M GEAR TRAINS

PART NO.	NAME OF PART	QTY.
203749	1st Red. Gear Bearing	3
203781	2nd Red. Gear (incl. 203749)	3
203782	1st Red. Gear (15T) (incl. 203749)	3
203783	2nd Red. Gear Pin	3
203784	2nd Red. Gear Bearing	3
203785	2nd Red. Spider	1
203786	1st Red. Spider (incl. 203793)	1
203793	1st Red. Gear Pin	3
844364	Retainer Ring	1
847147	Ball Bearing	1
867902	Rotor Pinion (15T)	1
867907	Gear Case	1
869584*	Pinion Spacer	1

*Denotes parts not included in subassembly.

The complete gear case can be purchased as a subassembly using Part No. 201522.

1ST REDUCTION 20M, 20K, 204P, 30K & 304P GEAR TRAINS

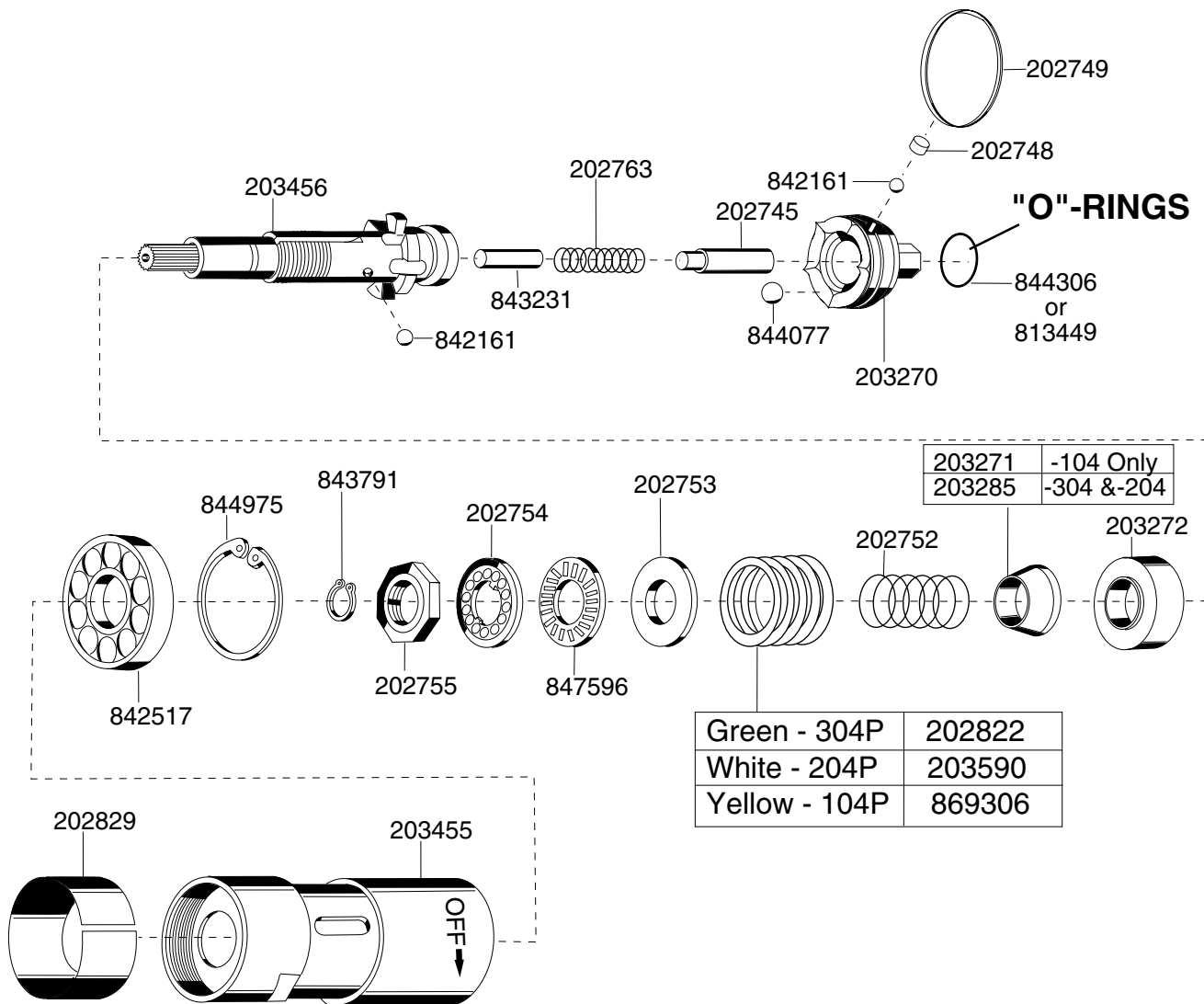


**PARTS LIST
20M, 20K, 204P, 30K & 304P GEAR TRAINS**

PART NO.	NAME OF PART	QTY.
844364	Bearing Retainer Ring	1
847147	Spider Bearing	1
867866	204 & 20 Idler Gear (18T) (incl. 867921)	3
867871	Gear Case	1
867872	204 & 20 Spider (incl. 867922)	1
867921	204, 20, 304 & 30 Idler Gear Bearing	3
867922	Idler Gear Pin	3
869181	304 & 30 Idler Gear (16T) (incl. 867921)	3
869182	304 & 30 Spider (incl. 867922)	1

The complete gear cases can be purchased as a subassembly using Part No. 204, 20M & 20K - 861573, 30K & 304 - 861680.

40 SERIES CLECOMATIC CLUTCH FOR 104P, 204P & 304P

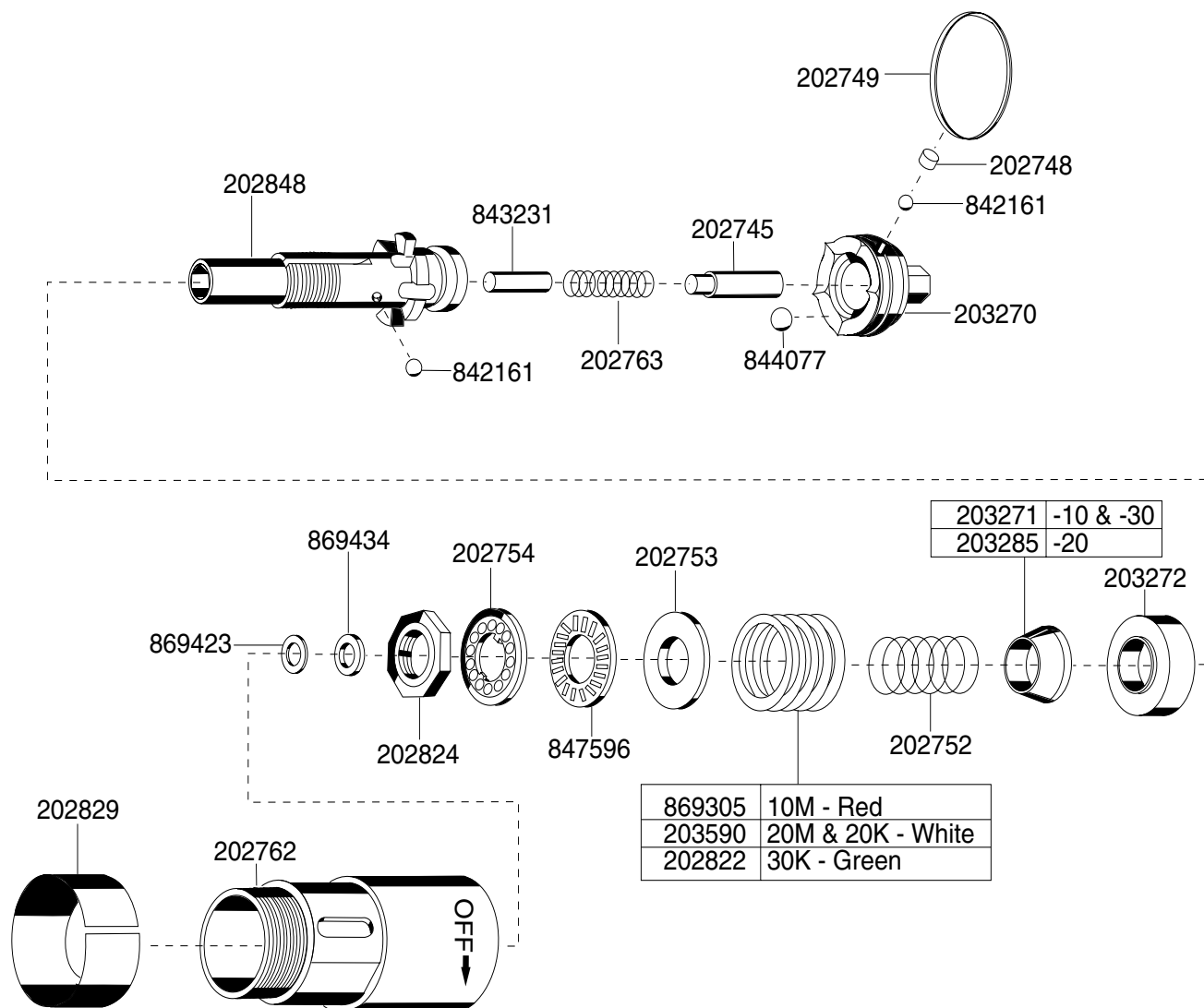


PARTS LIST — 40 SERIES 104P, 204P & 304P CLECOMATIC CLUTCH

PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
202745	Trip Plunger	1	203455*	Clutch Housing	1
202748	Ball Plug	1	203456	Clutch Spindle (15T)	1
202749	Retainer Ring	1	203590	Torque Spring (White)	1
202752	Release Spring	1	813449	"O"-ring	1
202753	Thrust Race	1	842161	3/16" Steel Ball	15
202754	Adjustment Plate	1	842517*	Ball Bearing	1
202755	Adjustment Nut	1	843231	Reset Pin	1
202763	Reset Spring	1	843791	Retainer Ring	1
202822	Torque Spring (Green)	1	844077	5/16" Steel Ball	5
202829*	Adjustment Cover	1	844306	"O"-ring	1
203270	Clutch Cam	1	844975*	Retainer Ring	1
203271	Release Sleeve (104)	1	847596	Thrust Bearing	1
203272	Ball Retainer	1	869306	Torque Spring (Yellow)	1
203285	Release Sleeve (304 & 204)	1			

The complete clutch can be purchased as a subassembly using these part numbers: 104P - 201422, 204P - 201441, & 304P - 201423. * Denotes parts not included in subassembly.

40 SERIES CLECOMATIC CLUTCH FOR 10M, 20M, 20K & 30K



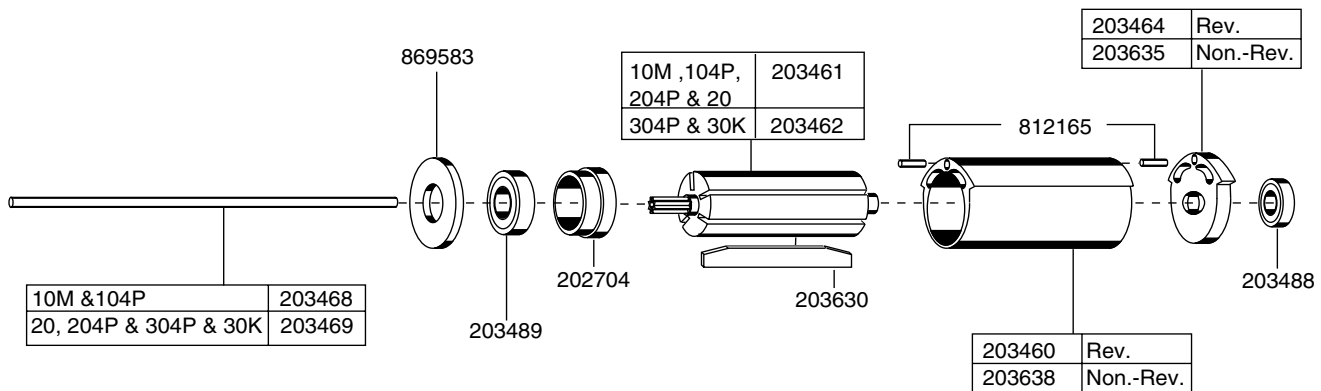
PARTS LIST — 40 SERIES 10M, 20M, 20K & 30K CLECOMATIC CLUTCH

PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
202745	Trip Plunger	1	203270	Clutch Cam	1
202748	Ball Plug	1	203271	Release Sleeve (0 & 0)	1
202749	Retainer Ring	1	203272	Ball Retainer	1
202752	Release Spring	1	203285	Release Sleeve (0)	1
202753	Thrust Race	1	203590	Torque Spring (White)	1
202754	Adjustment Plate	1	842161	3/16" Steel Ball	15
202762*	Clutch Housing	1	843231	Reset Pin	1
202763	Reset Spring	1	844077	5/16" Steel Ball	5
202822	Torque Spring (Green)	1	847596	Thrust Bearing	1
202824	Adjustment Nut	1	869305	Torque Spring (Red)	1
202829*	Adjustment Cover	1	869423*	Steel Spacer (.030"/.035")	**
202848	Clutch Spindle	1	869434*	Spacer (.090"/.097")	1

The complete clutch can be purchased as a subassembly using these part numbers: 10M - 201387, 20M & 20K - 201442, & 30K - 201388.

* Denotes parts not included in subassembly. ** Number of spacers required is variable.

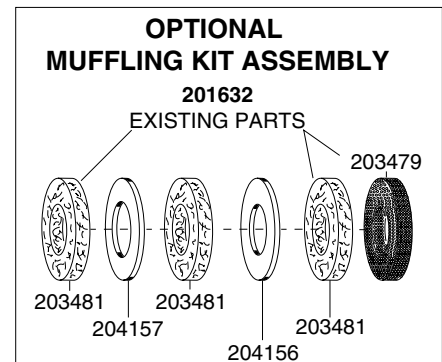
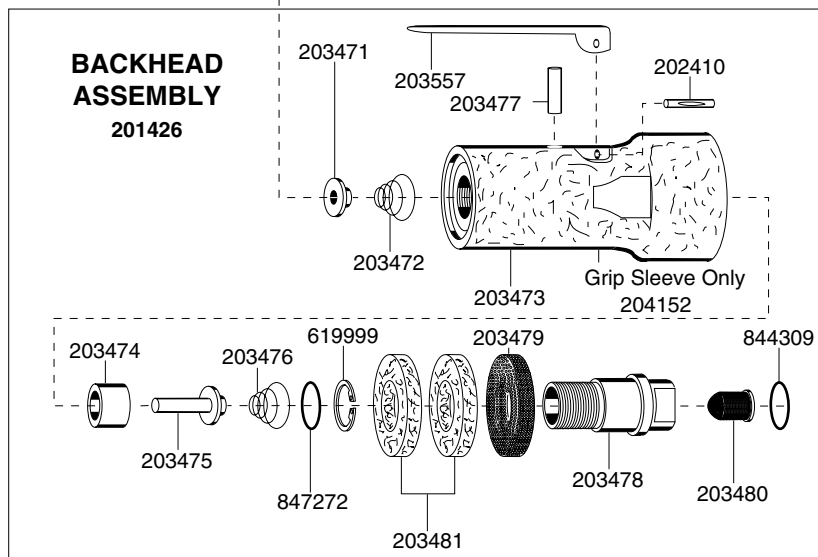
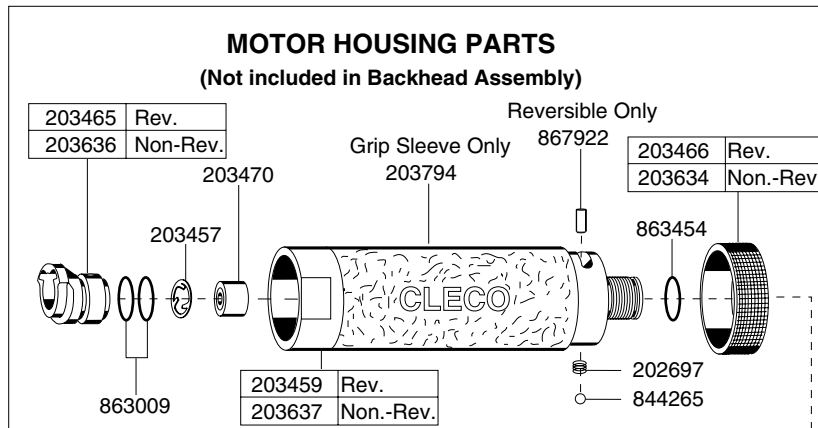
40 SERIES MOTORS FOR 10M, 20M, 20K, 30K, 104P, 204P & 304P



PARTS LIST — 40 SERIES 10M, 20M, 20K, 30K, 104P, 204P & 304P MOTORS

PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
202704	Front Bearing Plate	1	203488	Rear Bearing	1
203460	Cylinder	1	203489	Front Bearing	1
203461	10M, 104P, 204P & 20 Rotor (6T)	1	203630	Rotor Blade	5
203462	304P & 30K Rotor (9T)	1	203635	Rear Bering Plate (Non.-Rev.)	1
203464	Rear Bearing Plate	1	203638	Cylinder (Non.-Rev.)	1
203468	10M & 104P Trip Rod (.062" Dia. x 73/16" Lg.)	1	812165	Cylinder Pin	2
203469	204P, 20, 304P & 30K Trip Rod (.062" Dia. x 7/16" Lg.)	1	869583	Motor Spacer	1

40 SERIES **MOTOR HOUSING PARTS &** **BACKHEAD ASSEMBLY FOR** **10M, 20M, 20K, 30K, 104P, 204P & 304P**



PARTS LIST — 40 SERIES **MOTOR HOUSING & BACKHEAD ASSEMBLY FOR 10M, 20M, 20K, 30K, 104P, 204P & 304P**

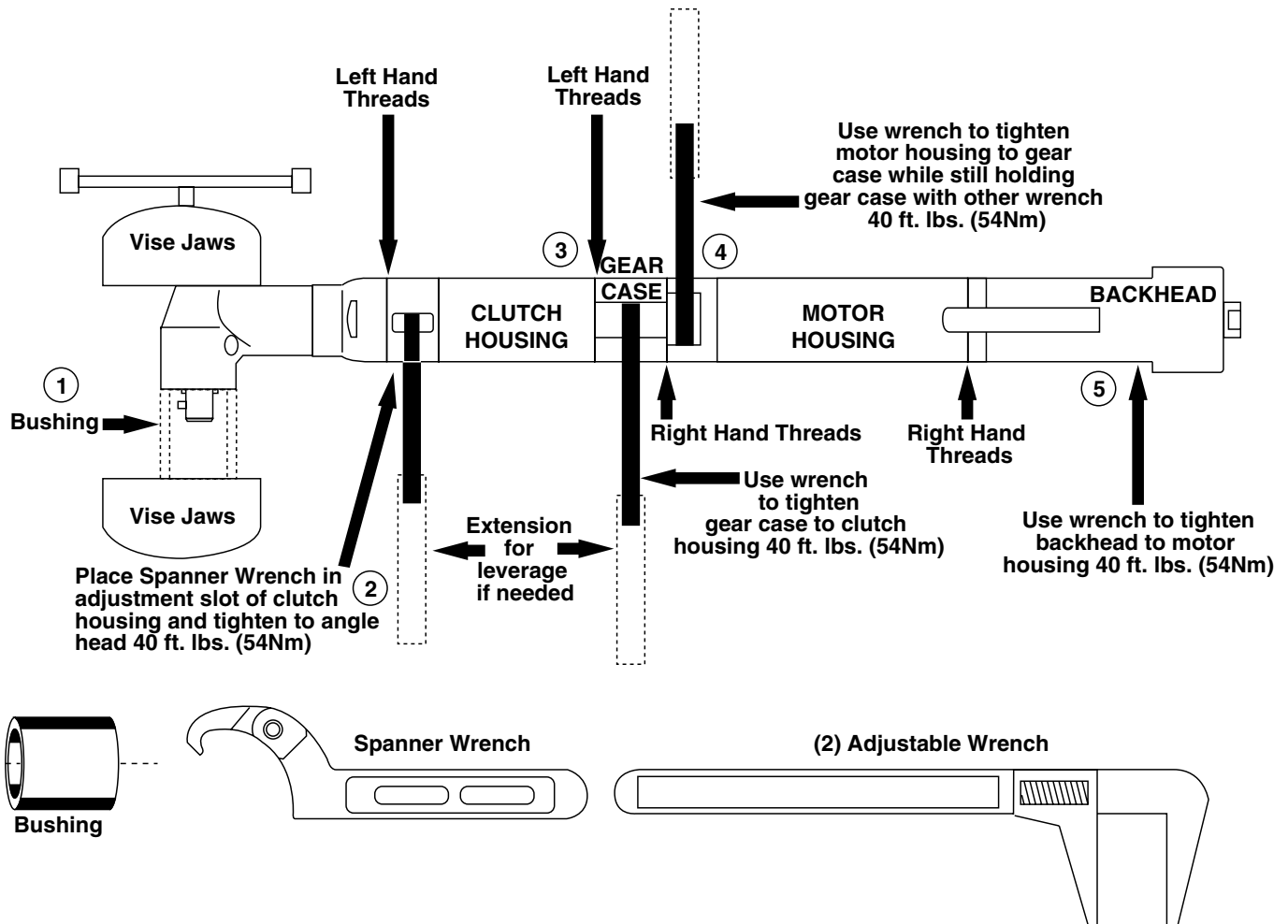
PART NO.	NAME OF PART	QTY.	PART NO.	NAME OF PART	QTY.
202410*	Lever Pin	1	203479*	Exhaust Deflector	1
202697	Spring	1	203480*	Strainer	1
203457	Finger Spring Spacer	1	203481*	Muffler	2
203459	Motor Housing (incl. 202967, 844265 & 203794)	1	203557*	Throttle Lever	1
203465	Reversing Valve	1	203634	Dummy Ring	1
203466	Reversing Valve Ring	1	203636	Valve Block	1
203470	Trip Rod Guide	1	203637	Motor Housing (Non.-Rev.) (incl. 203794)	1
203471	Shut-off Valve	1	203794	Grip Sleeve	1
203472	Shut-off Valve Spring	1	204152	Grip Sleeve	1
203473	Backhead (incl. 203474)	1	619999*	Retainer Ring	1
203474*	Throttle Valve Seat	1	844265	Ball	1
203475*	Throttle Valve	1	844309	"O"-Ring 7/16" x 5/8"	1
203476*	Throttle Valve Spring	1	847272*	"O"-Ring 5/8" x 3/4"	1
203477*	Throttle Valve Pin	1	863009	"O"-Ring 3/4" x 7/8" (Non-Rev. Qty.1)	2
203478*	Inlet Bushing	1	863454	"O"-Ring 9/16" x 11/16"	1

The complete backhead assembly can be purchased as a subassembly using these part number: 201426.

* Parts included in backhead assembly.

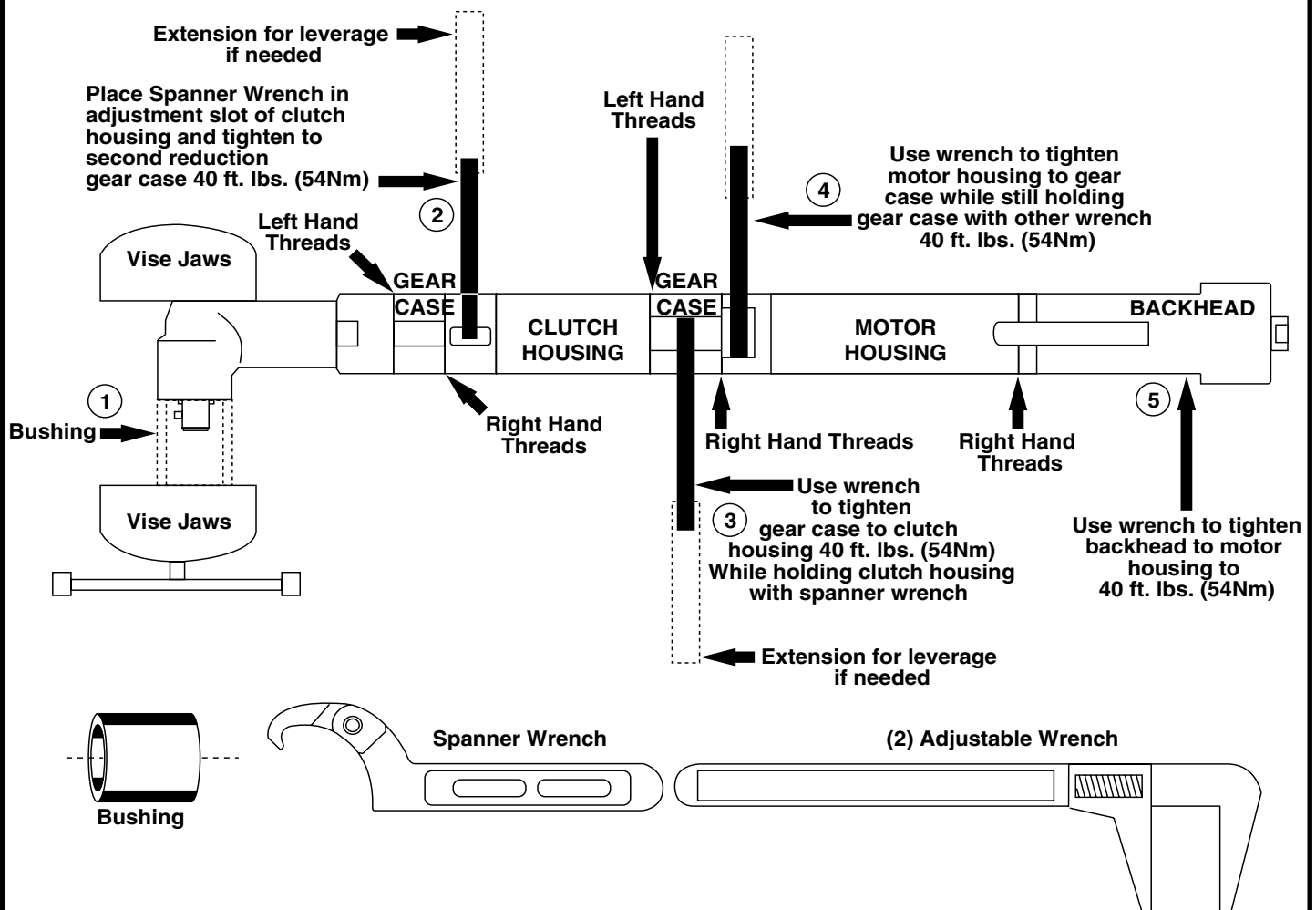
Tool Components Tightening Techniques for 40 Series Right Angle Nutrunners 10, 20 & 30 Gear Trains

1. Clamp angle head with bushing in vise. Tighten all other components before positioning angle head relationship to throttle lever.
2. Place spanner wrench in adjustment slot of clutch housing and tighten clutch housing to angle head to 40ft. lbs. (54Nm).
3. Tighten gear case to clutch housing to 40ft. lbs. (54Nm).
4. Tighten motor housing to gear case to 40ft. lbs. (54Nm) while holding gear case with other wrench.
5. Tighten backhead to motor housing securely.
6. Tool is equipped with the "M" or "K" head. All components must be tightened. Then the angle head must be loosened and shimmed for alignment.



Tool Components Tightening Techniques for 40 Series Right Angle Nutrunners 104, 204 & 304 Gear Trains

1. Clamp angle head with bushing in vise. Tighten all other components before positioning and tightening housing lock nut on angle head.
2. Place spanner wrench in adjustment slot of clutch housing and tighten clutch housing to second reduction gear case to 40ft. lbs. (54Nm).
3. Tighten first reduction gear case to clutch housing to 40ft. lbs. (54Nm).
4. Tighten motor housing to first reduction gear case to 40ft. lbs. (54Nm) while holding first reduction gear case with another wrench.
5. Tighten backhead to motor housing securely.
6. The "P" angle head has a spline for positioning the head to the throttle lever. Once alignment is achieved, the housing lock nut should be torqued to 20 ft. lbs.





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